We claim:

1. A fuel cell system comprising

a fuel cell unit; and

a catalytically active reactor unit (3) for at least partial chemical transformation of an operating medium stream (1), wherein the catalytically active reactor unit (3) has a catalytically active reactor volume (4) acted on by the operating medium stream and the catalytically active reactor unit comprises at least one control means (5, 8, 11, 12, 13) for controlling and/or for changing the catalytically active reactor volume (4) acted on by the operating medium stream (1).

2. The fuel cell system as defined in claim 1, wherein said catalytically active reactor unit (3) is a reformer, gas purifier stage and/or a combustor.

3. The fuel cell system as defined in claim 1, wherein said at least one control means (5, 8, 11, 12, 13) comprises means for controlling and/or changing a cross-sectional area (2) of said reactor volume (4) and said cross-sectional area (2) extends transverse to a flow direction of the operating medium stream (1).

4. The fuel cell system as defined in claim 1, wherein said at least one control means (5, 8, 11, 12, 13) comprises at least one diaphragm device (5) changeable transverse to a flow direction of the operating medium stream (1).

5. The fuel cell system as defined in claim 1, wherein said at least one control means (5, 8, 11, 12, 13) comprises a control element (8) movable in a flow direction of the operating medium stream (1).

6. The fuel cell system as defined in claim 5, wherein said control element (8) comprises a pipe.

7. The fuel cell system as defined in claim 5, wherein said control element (8) comprises, at least partially, a nozzle and/or an injector.

8. The fuel cell system as defined in claim 1, wherein said at least one control means (5, 8, 11, 12, 13) comprises means for controlling a length of said reactor volume (4), said length extending in a flow direction of the operating medium stream (1).

9. The fuel cell system as defined in claim 1, wherein said catalytically active reactor unit (3) has at least two outlet openings (13, 15) for outflow of a converted operating medium flow.

10. The fuel cell system as defined in claim 9, wherein at least a first (13) of said outlet openings is arranged upstream of a second (15) of said outlet openings in a flow direction of the operating medium stream (1).

11. The fuel cell system as defined in claim 9, further comprising at least one control valve (11, 12) for opening or closing at least one of said outlet openings (13, 15) of the catalytically active reactor unit (3).

12. The fuel cell system as defined in claim 9, wherein said catalytically active reactor unit (3) is provided with a plurality of transverse channels (14) extending transversely to a flow direction of the operating medium stream (1).

13. The fuel cell system as defined in claim 1, wherein said catalytically active reactor unit comprises at least two reactor regions with respective different permeabilities.

14. The fuel cell system as defined in claim 1, wherein said catalytically active reactor unit comprises at least two reactor regions with respective different catalytically active coatings.

15. A vehicle containing said fuel cell system as defined in one of claims 1 to 14.

16. A method of operating a fuel cell system, wherein said fuel cell system comprises a fuel cell unit and a catalytically active reactor unit (3) for at least partial chemical transformation of an operating medium stream (1), wherein the catalytically active reactor unit (3) has a catalytically active reactor volume (4) acted on by the operating medium stream (1) and the catalytically active reactor

unit comprises at least one control means for controlling and/or for changing the catalytically active reactor volume (4) acted on by the operating medium stream (1); said method comprising adjusting said catalytically active reactor volume (4) with said at least one control means so that a smaller reactor volume is acted on by the operating medium stream (1) during partial load operation than during full load operation.

17. The method as defined in claim 16, wherein said at least one control means comprises a variable diaphragm device (5a, 5b, 5c) arranged transversely to a flow direction of said operating medium stream (1) and said adjusting comprises changing a size of said variable diaphragm device.

18. A method of operating a fuel cell system, wherein said fuel cell system comprises a fuel cell unit and a catalytically active reactor unit (3) for at least partial chemical transformation of an operating medium stream (1) supplied to the fuel cell unit, wherein the catalytically active reactor unit (3) has a catalytically active reactor volume (4) acted on by the operating medium stream (1), the catalytically active reactor unit comprises at least one control means for controlling and/or for changing the catalytically active reactor volume (4) acted on by the operating medium stream (1) and said at least one control means includes a first valve (11) connected to the reactor unit (3) downstream of a maximum reactor volume of the reactor unit (3) and a second valve (12) connected to the reactor unit (3) upstream of said first valve (11) so that, when said first valve (11)

is opened and said second valve (12) is closed, said operating medium stream (1) flows through said maximum reactor volume; said method comprising the steps of:

a) opening said first valve (11) and closing said second valve (12) during full load operation so that said operating medium stream flows (1) through said maximum reactor volume; and

b) closing said first valve (11) and opening said second valve (12) during partial load operation so that said operating medium stream (1) flows through a reactor volume that is less than said maximum reactor volume.